



March 5, 2003

SUBSTITUTE SEQUENCE LISTING

<110> ESTADSEN  
Schmidt, Arno  
Zinke, Holger

<120> Recombinant Fusion Proteins Based on  
Ribosome-Inactivating Proteins of the mistletoe Viscum  
album

<130> 09282-5

<140> 09/347,064

<141> 1999-07-02

<150> PCT/EP98/00009

<151> 1998-01-02

<150> EP 97 10 0012.0

<151> 1997-01-02

<160> 38

<170> PatentIn Ver. 2.1

<210> 1

<211> 762

<212> DNA

<213> Viscum album

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gcttaccagg caggcgacca atcctacttt ttgcgcgacg caccacgcgg cgcggaaacg 300  
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gtcacggcgc tctgttttcc gggcggcagc acgcgtatcc aagctcgttc gattttaate 480  
ctcattcaga tgatctccga ggcgcgcaga ttcaatccga tcttatggag ggctcgccaa 540  
tacattaaca gtggggcgtc atttctgcca gacgtgtaca tgctggagct ggagacgagt 600  
tggggccaac aatccacgca agtccagcat tcaaccgatg gcgtttttaa taaccaat 660  
cggttggtca tacccccggg taacttcgtg acgttgacca atgttcgcga cgtgatcgcc 720  
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<210> 2

<211> 252

<212> PRT

<213> Viscum album

<400> 2

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1 5 10 15

Glu Tyr Phe Arg Phe Ile Thr Leu Leu Arg Asp Tyr Val Ser Ser Gly  
20 25 30

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Ser Phe Ser Asn Glu Ile Pro Leu Leu Arg Gln Ser Thr Ile Pro Val  
35 40 45

Ser Asp Ala Gln Arg Phe Val Leu Val Glu Leu Thr Asn Gln Gly Gly  
50 55 60

Asp Ser Ile Thr Ala Ala Ile Asp Val Thr Asn Leu Tyr Val Val Ala  
65 70 75 80

Tyr Gln Ala Gly Asp Gln Ser Tyr Phe Leu Arg Asp Ala Pro Arg Gly  
85 90 95

Ala Glu Thr His Leu Phe Thr Gly Thr Arg Ser Ser Leu Pro Phe  
100 105 110

Asn Gly Ser Tyr Pro Asp Leu Glu Arg Tyr Ala Gly His Arg Asp Gln  
115 120 125

Ile Pro Leu Gly Ile Asp Gln Leu Ile Gln Ser Val Thr Ala Leu Arg  
130 135 140

Phe Pro Gly Gly Ser Thr Arg Thr Gln Ala Arg Ser Ile Leu Ile Leu  
145 150 155 160

Ile Gln Met Ile Ser Glu Ala Ala Arg Phe Asn Pro Ile Leu Trp Arg  
165 170 175

Ala Arg Gln Tyr Ile Asn Ser Gly Ala Ser Phe Leu Pro Asp Val Tyr  
180 185 190

Met Leu Glu Leu Glu Thr Ser Trp Gly Gln Gln Ser Thr Gln Val Gln  
195 200 205

His Ser Thr Asp Gly Val Phe Asn Asn Pro Ile Arg Leu Ala Ile Pro  
210 215 220

Pro Gly Asn Phe Val Thr Leu Thr Asn Val Arg Asp Val Ile Ala Ser  
225 230 235 240

Leu Ala Ile Met Leu Phe Val Cys Gly Glu Arg Pro  
245 250

<210> 3

<211> 828

<212> DNA

<213> Viscum album

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cagttgtggc cctccaagtc caacaatgat ccgaatcagt tgtggacgat caaaagggat 180  
ggaaccattc gatccaatgg cagctgcttg accacgtatg gctatactgc tggcgtctat 240  
gtgatgatct tcgactgtaa tactgctgtg cgggaggcca ctctttggca gatatggggc 300  
aatgggacca tcatcaatcc aagatccaat ctggttttgg cagcatcatc tggatcaaaa 360  
ggcactacgc ttacggtgca aacactggat tacacgttgg gacagggtctg gcttgcgggt 420

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aatgataccg cccacgcga ggtgaccata tatgggttca gggaccttgg catggaatca 480  
aatggagaga gtgtgtgggt ggagacgtgc gtgagttagcc aaaagaacca aagatgggct 540  
ttgtacgggg atggttctat acgcccacaa caaaaccaag accaatgcct cacctgtggg 600  
agagactccg tttaacacgt aatcaatata gttagctgca gcgctggatc gtctgggcag 660  
cgatgggtgt ttaccaatga aggggccatt ttgaatttaa agaattgggt ggccatggat 720  
gtggcgcaag caaatccaaa gctccgccga ataactatct atcctggcac agggaaaacca 780  
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<210> 4

<211> 267

<212> PRT

<213> Viscum album

<400> 4

Asp Asp Val Thr Cys Ser Ala Ser Glu Pro Thr Val Arg Ile Val Gly  
1 5 10 15  
Arg Asn Gly Met Cys Val Asp Val Arg Asp Asp Asp Phe Arg Asp Gly  
20 25 30  
Asn Gln Ile Gln Leu Trp Pro Ser Lys Ser Asn Asn Asp Pro Asn Gln  
35 40 45  
Leu Trp Thr Ile Lys Arg Asp Gly Thr Ile Arg Ser Asn Gly Ser Cys  
50 55 60  
Leu Thr Thr Tyr Gly Tyr Thr Ala Gly Val Tyr Val Met Ile Phe Asp  
65 70 75 80  
Cys Asn Thr Ala Val Arg Glu Ala Thr Leu Trp Gln Ile Trp Gly Asn  
85 90 95  
Gly Thr Ile Ile Asn Pro Arg Ser Asn Leu Val Leu Ala Ala Ser Ser  
100 105 110  
Gly Ile Lys Gly Thr Thr Leu Thr Val Gln Thr Leu Asp Tyr Thr Leu  
115 120 125  
Gly Gln Gly Trp Leu Ala Gly Asn Asp Thr Ala Pro Arg Glu Val Thr  
130 135 140  
Ile Tyr Gly Phe Arg Asp Leu Cys Met Glu Ser Asn Gly Gly Ser Val  
145 150 155 160  
Trp Val Glu Thr Cys Val Ser Ser Gln Lys Asn Gln Arg Trp Ala Leu  
165 170 175  
Tyr Gly Asp Gly Ser Ile Arg Pro Lys Gln Asn Gln Asp Gln Cys Leu  
180 185 190  
Thr Cys Gly Arg Asp Ser Val Ser Thr Val Ile Asn Ile Val Ser Cys  
195 200 205  
Ser Ala Gly Ser Ser Gly Gln Arg Trp Val Phe Thr Asn Glu Gly Ala  
210 215 220

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Ile Leu Asn Leu Lys Asn Gly Leu Ala Met Asp Val Ala Gln Ala Asn  
225 230 235 240

Pro Lys Leu Arg Arg Ile Ile Ile Tyr Pro Ala Thr Gly Lys Pro Asn  
245 250 255

Gln Met Trp Leu Pro Val Pro Gly Gly Tyr His  
260 265

<210> 5  
<211> 72  
<212> DNA  
<213> Viscum album

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gatgttacat gt 72

<210> 6  
<211> 17  
<212> PRT  
<213> Viscum album

<400> 6  
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1 5 10 15  
Ala

<210> 7  
<211> 756  
<212> DNA  
<213> Viscum album

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atcacgccttc tccgagatta tgtctcaagc ggaagctttt caaatgagat accactcttg 120  
cgtcagtgcta cgatccccgt ctccgatgcg caaagatttg tcttggtgga gctcaccaac 180  
caggggggag actcgatcac ggccgccatc gacgttacc aatctgactc cgtgggttac 240  
caagcaggcg accaatccca ctttttgcgc gacgcaccac gcggcgcgga aacgcacatc 300  
ttcacccgca ccaccccgatc ctctctccca ttcaacggaa gctaccctga tctggagcga 360  
tacgcgggac atagggacca gatccctctc ggtatagacc aactcatcca atccgtcacg 420  
gcgcttctgt ttccgggcgcg cagcacgcgt acccaagctc gttcgatttc aatctcatt 480  
cagatgatct ccgagggcgc cagattcaat cccatcttat ggagggctcg ccaatacatt 540  
aacagtgggg cgtcatttct gccagacgtg tacatgctgg agctggagac gagtggggc 600  
caacaatcca gcgaagtcca gcattcaacc gatggcgttt ttaataacc aattcggttg 660  
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<210> 8  
<211> 252  
<212> PRT  
<213> Viscum album

<400> 8

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Tyr Glu Arg Ile Arg Leu Arg Val Thr His Gln Thr Thr Gly Glu Glu  
1 5 10 15  
Tyr Phe Arg Phe Ile Thr Leu Leu Arg Asp Tyr Val Ser Ser Gly Ser  
20 25 30  
Phe Ser Asn Glu Ile Pro Leu Leu Arg Gln Ser Thr Ile Pro Val Ser  
35 40 45  
Asp Ala Gln Arg Phe Val Leu Val Glu Leu Thr Asn Gln Gly Gly Asp  
50 55 60  
Ser Ile Thr Ala Ala Ile Asp Val Thr Asn Leu Tyr Val Val Ala Tyr  
65 70 75 80  
Gln Ala Gly Asp Gln Ser Tyr Phe Leu Arg Asp Ala Pro Arg Gly Ala  
85 90 95  
Glu Thr His Leu Phe Thr Gly Thr Thr Arg Ser Ser Leu Pro Phe Asn  
100 105 110  
Gly Ser Tyr Pro Asp Leu Glu Arg Tyr Ala Gly His Arg Asp Gln Ile  
115 120 125  
Pro Leu Gly Ile Asp Gln Leu Ile Gln Ser Val Thr Ala Leu Arg Phe  
130 135 140  
Pro Gly Gly Ser Thr Arg Thr Gln Ala Arg Ser Ile Leu Ile Leu Ile  
145 150 155 160  
Gln Met Ile Ser Glu Ala Ala Arg Phe Asn Pro Ile Leu Trp Arg Ala  
165 170 175  
Arg Gln Tyr Ile Asn Ser Gly Ala Ser Phe Leu Pro Asp Val Tyr Met  
180 185 190  
Leu Glu Leu Glu Thr Ser Trp Gly Gln Gln Ser Thr Gln Val Gln His  
195 200 205  
Ser Thr Asp Gly Val Phe Asn Asn Pro Ile Arg Leu Ala Ile Pro Pro  
210 215 220  
Gly Asn Phe Val Thr Leu Thr Asn Val Arg Asp Val Ile Ala Ser Leu  
225 230 235 240  
Ala Ile Met Leu Phe Val Cys Gly Glu Arg Pro Ser  
245 250

<210> 9

<211> 789

<212> DNA

<213> Viscum album

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aagtcacaac atgatccgaa tcaattgttg acgatcaaaa gggatggaac cattcgatcc 180
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tgtaataactg ctgtgcggga ggccactctt tggcagatat ggggcaatgg gaccatcatc 300
aatccaagat ccaatctggt tttggcagca tcactctggaa tcaaaggcac tacgcttacg 360
gtgcaaacac tggattacac gttgggacag ggctggcttg ccggtaatga taccgcccc 420
cgcgagggtga ccataatgg gttcaggagc ctttgcatgg aatcaaatgg agggagtggt 480
tgggtgggaga cgtgcgtgag tagccaaag aaccaaatg gggctttgta cggggatggt 540
tctatacgcc ccaaacaaaa ccaagaccaa tgcctcacct gtgggagaga ctccgtttca 600
acagataatc atatatgttg ctgcagcgtt ggatcgtctg ggcagcggat ggtgtttacc 660
aatgaagggg ccattttgaa tttaaagaat gggttgcca tggatgtggc gcaagcaaat 720
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cccggtgcca

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<210> 10  
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 <212> PRT  
 <213> Viscum album

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          20          25          30
Asn Gln Ile Gln Leu Trp Pro Ser Lys Ser Asn Asn Asp Pro Asn Gln
          35          40          45
Leu Trp Thr Ile Lys Arg Asp Gly Thr Ile Arg Ser Asn Gly Ser Cys
          50          55          60
Leu Thr Thr Tyr Gly Tyr Thr Ala Gly Val Tyr Val Met Ile Phe Asp
          65          70          75          80
Cys Asn Thr Ala Val Arg Glu Ala Thr Leu Trp Gln Ile Trp Gly Asn
          85          90          95
Gly Thr Ile Ile Asn Pro Arg Ser Asn Leu Val Leu Ala Ala Ser Ser
          100          105          110
Gly Ile Lys Gly Thr Thr Leu Thr Val Gln Thr Leu Asp Tyr Thr Leu
          115          120          125
Gly Gln Gly Trp Leu Ala Gly Asn Asp Thr Ala Pro Arg Glu Val Thr
          130          135          140
Ile Tyr Gly Phe Arg Asp Leu Cys Met Glu Ser Asn Gly Gly Ser Val
          145          150          155          160
Trp Val Glu Thr Cys Val Ser Ser Gln Lys Asn Gln Arg Trp Ala Leu
          165          170          175
Tyr Gly Asp Gly Ser Ile Arg Pro Lys Gln Asn Gln Asp Gln Cys Leu
          180          185          190
Thr Cys Gly Arg Asp Ser Val Ser Thr Val Ile Asn Ile Val Ser Cys

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195                      200                      205  
 Ser Ala Gly Ser Ser Gly Gln Arg Trp Val Phe Thr Asn Glu Gly Ala  
 210                      215                      220  
 Ile Leu Asn Leu Lys Asn Gly Leu Ala Met Asp Val Ala Gln Ala Asn  
 225                      230                      235                      240  
 Pro Lys Leu Arg Arg Ile Ile Ile Tyr Pro Ala Thr Gly Lys Pro Asn  
 245                      250                      255  
 Gln Met Trp Leu Pro Val Pro  
 260

<210> 11  
 <211> 48  
 <212> DNA  
 <213> Viscum album

<400> 11  
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<210> 12  
 <211> 16  
 <212> PRT  
 <213> Viscum album

<400> 12  
 Ser Ser Glu Val Arg Tyr Trp Pro Leu Val Ile Arg Pro Val Ile Ala  
 1                      5                      10                      15

<210> 13  
 <211> 94  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Synthetic gene  
 encoding amino acids 53-78 of human P2 protein

<400> 13  
 gtaccgggtg gcggtcgtac cgaatccacc ttcaaaaaca ccgaaatctc cttcaaaactg 60  
 ggtcaggaat tcgaagaaac caccgctgac aact 94

<210> 14  
 <211> 26  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Amino acids  
 53-78 of human P2 protein

<400> 14  
Arg Thr Glu Ser Thr Phe Lys Asn Thr Glu Ile Ser Phe Lys Leu Gly  
1 5 10 15

Gln Glu Phe Glu Glu Thr Thr Ala Asp Asn  
20 25

<210> 15  
<211> 75  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Fig. 20:  
Synthetic linker cassette for providing modularity  
at the 3' end of rMLB delta lalpha lbeta

<400> 15  
caccggtaaa ccgaaccaga tgtggctgcc ggtaccgtag taacgctcct cgtcgaccta 60  
gtaaggatcc ctcga 75

<210> 16  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Fig. 20: amino  
acid sequence encoded by portion of SEQ ID NO: 15

<400> 16  
Thr Gly Lys Pro Asn Gln Met Trp Leu Pro Val Pro  
1 5 10

<210> 17  
<211> 82  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Fig. 21:  
Synthetic linker cassette for providing modularity  
at the 3'end of rMLB Delta lalpha lbeta 2gamma  
with affinity module ("His-Tag").

<400> 17  
ccggtaaacc gaaccagatg tggctgccgg taccgggtgg tggatatcat caaccaccatc 60  
accactagta actcctcgga tc 82

<210> 18  
<211> 21  
<212> PRT  
<213> Artificial Sequence



<220>

<223> Description of Artificial Sequence:Amino acid  
sequence encoded by a portion of SEQ ID NO: 17

<400> 18

Gly Lys Pro Asn Gln Met Trp Leu Pro Val Pro Gly Gly Gly Tyr His  
1 5 10 15

His His His His His  
20

<210> 19

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Codon exchange  
rMLB D23A

<400> 19

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<210> 20

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Fig. 22:  
Mutagenic oligonucleotides for inactivating  
carbohydrate binding sites in rMLB. - lalpha2  
(W38A). -

<400> 20

cagatacagt tggcgccctc caagtcc

27

<210> 21

<211> 61

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Fig. 22:  
Mutagenic oligonucleotides for inactivating  
carbohydrate binding sites in rMLB. - lbeta (Y68S,  
Y70S, Y75S, F79S). -

<400> 21

gctgcttgac cagctctggc tctactgctg gcgtctctgt gatgatctcc gactgtaaba  
c 60  
61

<210> 22  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Fig. 22:  
 Mutagenic oligonucleotides for inactivating  
 carbohydrate binding sites in rMLB. - 1beta1  
 (D235A). -

<400> 22  
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26

<210> 23  
 <211> 26  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Fig. 22  
 Mutagenic oligonucleotides for inactivating  
 carbohydrate binding sites in rMLB. - 2gamma2  
 (Y249A). -

<400> 23  
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26

<210> 24  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Fig. 22:  
 Mutagenic oligonucleotides for inactivating  
 carbohydrate binding sites in rMLB. - pT7 EcoRV to  
 SspI. -

<400> 24  
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35

<210> 25  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Fig. 22:  
 Mutagenic oligonucleotides for inactivating  
 carbohydrate binding sites in rMLB. - pT7 SspI to  
 EcoRV. -

<400> 25

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35

<210> 26

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Fig. 23:  
Mutagenic oligonucleotides for constructing  
modular ITF gene cassettes. - pT7 Delta NdeI to  
StuI. -

<400> 26

ctttaagaag gagatataca ggcctacgag aggctaagac

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<210> 27

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Fig. 23:  
Mutagenic oligonucleotides for constructing  
modular ITF gene cassettes. - rMLB silent NheI. -

<400> 27

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33

<210> 28

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Fig. 23:  
Mutagenic oligonucleotides for constructing  
modular ITF gene cassettes. - rMLA Delta AgeI. -

<400> 28

cccaccagac caccggcgaa gaatatttcc gg

32

<210> 29

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Fig. 23:  
Mutagenic oligonucleotides for constructing  
modular ITF gene cassettes.

<400> 29

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40

<210> 30  
<211> 43  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Fig. 23:  
Mutagenic oligonucleotides for constructing  
modular ITF gene cassettes. - rMLB Delta EcoNI to  
AgeI. -

<400> 30  
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43

<210> 31  
<211> 11  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Flanking region  
of the ProML gene cassette in expression vector  
pT7ProML

<400> 31  
tacatatgta c

11

<210> 32  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Flanking region  
of the ProML gene cassette in expression vector  
pT7ProML

<400> 32  
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<210> 33  
<211> 9  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Flanking region  
of the IML gene cassette in expression vector  
PIML-02-P

<400> 33

caggcctac

9

&lt;210&gt; 34

&lt;211&gt; 34

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence:Flanking region  
of the IML gene cassette in expression vector  
PIML-02-P

&lt;400&gt; 34

cactagtaac tcctcggatc ctctagagtc gacc

34

&lt;210&gt; 35

&lt;211&gt; 4

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence:Modulator  
module peptide

&lt;400&gt; 35

Lys Asp Glu Leu

1

&lt;210&gt; 36

&lt;211&gt; 4

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence:Modulator  
module peptide

&lt;400&gt; 36

His Asp Glu Leu

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&lt;210&gt; 37

&lt;211&gt; 17

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence:Portion of the  
ML propeptide

&lt;400&gt; 37

Ser Ser Ser Glu Val Arg Tyr Trp Pro Leu Val Ile Arg Pro Val Ile

1

5

10

15

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Ala

<210> 38

<211> 13

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: A degradation product of myelin basic protein.

<400> 38

Val His Phe Phe Lys Asn Ile Val Thr Pro Arg Thr Pro  
1 5 10